Title (en)

Droplet target delivery method for high pulse-rate laser-plasma extreme ultraviolet light source

Title (de)

Verfahren zur Produktion von Tröpfchentargets für eine Laser-Plasma extrem-ulltraviolett-Lichtquelle mit hoher Pulsrate

Title (fr)

Procédé de production des gouttelettes cibles pour une source de lumière extrême ultraviolet d'un taux d'impulsions élevé

Publication

**EP 1367866 A1 20031203 (EN)**

Application

**EP 03011055 A 20030520**

Priority

US 15754002 A 20020528

Abstract (en)

A laser-plasma, EUV radiation source (10) that controls the target droplet delivery rate so that successive target droplets (66, 72) are not affected by the ionization of a preceding target droplet. A source nozzle (50) of the source (10) has an orifice (56) of a predetermined size that allows the droplets (54) to be emitted at a rate set by the target materials natural Rayleigh instability break-up frequency as generated by a piezoelectric transducer (58). The rate of the droplet generation is determined by these factors in connection with the pulse frequency of the excitation laser (14) so that buffer droplets (70) are delivered between the target droplets (66, 72). The buffer droplets (70) act to absorb radiation generated from the ionized target droplet (66) so that the next target droplet (72) is not affected. <IMAGE>

IPC 1-7

**H05G 2/00**

IPC 8 full level

**G21K 5/00** (2006.01); **G21K 5/02** (2006.01); **G21K 5/08** (2006.01); **H01L 21/027** (2006.01); **H05G 1/00** (2006.01); **H05G 2/00** (2006.01); **H05H 1/24** (2006.01)

CPC (source: EP US)

**H05G 2/003** (2013.01 - EP US); **H05G 2/008** (2013.01 - EP US)

Citation (search report)

- [X] WO 0149086 A1 20010705 - KONINKL PHILIPS ELECTRONICS NV [NL]
- [X] RYMELL L ET AL: "Liquid-jet target laser-plasma sources for EUV and X-ray lithography", MICROELECTRONIC ENGINEERING, ELSEVIER PUBLISHERS BV., AMSTERDAM, NL, vol. 46, no. 1-4, May 1999 (1999-05-01), pages 453 - 455, XP004170761, ISSN: 0167-9317

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EP2232330A4; CN104488362A; CN106605450A; US9860966B2; US9735535B2; WO2016177519A1; WO2013174620A1

Designated contracting state (EPC)

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DOCDB simple family (application)

**EP 03011055 A 20030520**; DE 60310807 T 20030520; JP 2003148899 A 20030527; JP 2010095012 A 20100416; US 15754002 A 20020528